Highlights

The Virginia Regional Environmental Management System (V-REMS)

Diesel School Bus Retrofit Project

Diesel School Bus Retrofit Project Goal:

To improve the air quality for 20,000 children in the cities of Richmond and Hopewell Virginia.

Background:

Emissions from diesel school bus engines expose children to pollutants that create serious health risks such as aggravated asthma. In addition, diesel emissions adversely impact the overall air quality of Metropolitan Richmond, contributing to the area being in non-attainment of EPA's 8-Hour Ozone Restrictions. To reduce school bus air pollution, the **EPA Clean School Bus USA** (CSB USA) program provides grants to school districts across the country to fund retrofitting initiatives, anti-idling policies, and the replacement of older buses.

A Diesel Oxidation Catalyst (DOC) is installed on a V-REMS partner's school bus. DOCs are durable devices, often coming with a warranty for 100,000 – 150,000 miles or 7 - 15 years.

Quick Facts: Diesel Engine Retrofit

There are a variety of options for retrofitting diesel engines with pollution control devices and cleaner fuels which vary with respect to cost, pollution reduction capability, and applicability to different engines. The retrofits chosen by V-REMS for their school buses include:

- **Installation of a Diesel Oxidation Catalyst (DOC) that transforms pollutants like carbon monoxide and hydrocarbon particles to less harmful components.**
- **Reprogramming of the Electronic Control Module (ECM) to improve the efficiency of the bus's operation and thereby reduce fuel emissions.**
- **DOC installation costs $1,000 - $2,000 per vehicle and requires 1-3 labor hours.**

The Challenge: Developing a CSB Proposal and Identifying a Cost Share

The CSB USA helps communities address problems associated with school buses emissions; however, school districts face significant difficulty investing up-front time for proposal development and with identifying a cost share funding source. This dual challenge may prevent school districts from applying for grants.

A Solution: Leveraging the V-REMS Partnership's Leadership and Resources to Apply for the EPA's CSB Program

Before hearing about the CSB USA grant opportunity, V-REMS had already been working on reducing its collective air emissions through measures such as using low VOC paints, redesigning grounds maintenance activities, and increasing ride-sharing. The CSB USA grant presented an opportunity for the partnership to leverage significant funding to improve the air for the region's most valued citizens: its children. The V-REMS partnership developed a proposal and the Virginia Department of Environmental Quality (DEQ) offered to provide the required 5% cost share, immediately overcoming the biggest proposal development hurdles.

"The V-REMS Partnership was an indispensable component to winning the grant. It was not only responsible for raising the opportunity, V-REMS also remained actively engaged in the process and allowed us to overcome all procedural roadblocks from concept to implementation."

Vincent Ashley,
Richmond Public Schools,
Coordinator of Pupil Transportation

V-REMS
Virginia Regional
Environmental Management System

The Virginia Regional Environmental Management System (V-REMS) partnership joins over 35 public (federal, state, county, and local) and private organizations in the greater Richmond area to address complex community and environmental issues through an innovative partnership approach. The partnership strengthens community relationships and reduces air, water, and waste emissions, promoting environmental sustainability in the areas where its partners operate. The Diesel School Bus Retrofit project is one of the many environmental initiatives that V-REMS pursues. More details on the V-REMS partnership and additional fact sheets profiling V-REMS efforts related to E-85 Fueling Stations, Stormwater Management, and Energy Efficiency can be found at http://www.peercenter.net/RegionalCollaborations.cfm.

Accomplishments* and Projections:

V-REMS Participants cut cake in celebration of the CSB USA grant award. From left to right: Brian Matthay (GETF), Vincent Ashley (Richmond School Bus District), Doris McLeod (Virginia DEQ), and Laura Rodman (US Army).

- Received a $274,000 CSB USA grant in February 2006, to retrofit 197 school buses, leading to cleaner air for 20,000 children and reducing the impact of school bus emissions on the Richmond Metropolitan 8-Hour Ozone Standard Non-Attainment Area.
- Implemented an anti-idling policy for Richmond school buses, which reduces idling by 6,188 hours annually and saves Richmond Schools $18,000 per year in avoided fuel costs.
- Training and capacity building for members of Richmond (including a maintenance contractor) and Hopewell Public Schools, through participation in a Green Diesel Technology Train-the-Trainer Program to learn the methodology for the inspection and installation of a DOC.
- Encouraging other school districts in Virginia and across the country to apply for CSB USA grants in future years, transferring the lessons learned from Richmond's and Hopewell's experiences.

* In some cases, the accomplishments identified are the results of individual V-REMS partners' voluntary efforts. In others, environmental projects were already in effect when organizations joined V-REMS and experiences were shared. In most instances, partners identified common problems or needs or solutions, shared their experiences, and developed joint projects resulting in environmental improvements.

"It's a great day for students in the Richmond and Hopewell School Districts. The 20,000 students that ride school buses in these two districts will no longer have to worry about breathing the harmful black puff of diesel smoke that is produced by school bus engines."

Don Welsh,
EPA Region III,
Administrator

Diesel School Bus Retrofit Projected Metrics of Success

The following projections are based on retrofits to be completed through the CSB USA grant. The calculations for estimating the metrics of success are based on a series of assumptions such as the fuel efficiency of school buses to be retrofitted, the emissions reductions achieved by DOCs and reprogrammed ECMs, the number idling hours to be reduced, etc. The process for calculating and evaluating the metrics of success will undoubtedly evolve—suggestions are welcome.

- **Richmond to retrofit 170 of its 234 buses with DOCs and 67 of these buses with re-programmed ECMs.**
- **Hopewell to retrofit 27 of its 31 buses with DOCs.**
- **Raised $288,000 to fund retrofits ($274,000 from U.S. EPA; $14,000 from Virginia DEQ).**
- **20,000 students in these school districts will breathe cleaner air because of partnership activities.**
- **Hydrocarbon emissions will be reduced by 50% (3,851 lbs. annually) due to retrofitting with the DOCs; carbon monoxide will be reduced by 40% (11,540 lbs. annually); and, particulate matter will be reduced by 20% (144 lbs. annually).**
- **New anti-idling policies will reduce idling by 6,188 hours per year, saving $18,000 per year in fuel costs, and eliminating 21 lbs of particulate matter.**

Hopewell City employees retrofitting a school bus.

V-REMS Partnership Sponsors:
Defense Supply Center Richmond, Defense Logistics Agency, DoD
White House Council on Environmental Quality

For More Information:
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